INDIVIDUAL DIFFERENCES IN DOPAMINE-SENSITIVE BEHAVIORS: ROLE OF CCK. F. J. Vaccarino, N. DeSouza, T. Sills. Departments of Psychology and Psychiatry, University of Toronto, Toronto, Ontario, M5S 1A1.

Current evidence indicates that there are individual differences in the expression of behaviors which are under the control of central dopamine (DA) transmission, particularly mesolimbic DA. Examples of such behaviors include: novelty and amphetamine (AMP)-induced exploratory activity, psychostimulant self-administration, and sugar-selective feeding. Numerous studies from our laboratory and others indicate that animals can be divided into high and low responders on these various behavioral dimensions, and that these differences reflect differences in DAergic tone between animals. That is, high responders appear to have naturally elevated DA activity (particularly mesolimbic DA) compared to low responders.

Evidence indicating that CCK exerts potent modulatory effects on mesolimbic DA function, raises the possibility that CCK plays a role in mechanisms underlying individual differences in DAergic behaviors. We have undertaken a series of studies aimed at examining this issue. With regard to amphetamine-induced locomotor activity, low responders show an elevated response to AMP following both systemic or intra-nucleus accumbens (ACB) treatment with CCK-B antagonists. Consistent with this finding, low sugar feeders show elevated sugar intake following systemic or intra-ACB treatment with CCK-B antagonists. High responders show either no effect or the opposite trend following CCK-B antagonist treatments. Together, these results suggest that elevated endogenous CCK-B receptor activation is a mechanism contributing to the attenuated DAergic function in low responders. In light of the known anxiolytic indications of CCK-B antagonists and the effectiveness of CCK-B antagonists in behaviors associated with low DAergic tone, it is interesting to speculate that low dopaminergic responsiveness may reflect a component of anxiogenic behavior. Indeed, recent evidence from our laboratory indicates that low sugar feeders and low exploratory animals, display more anxiogenic behaviors in the elevated plus maze compared to rats showing normal profiles of DAergic behaviors.